DOCUMENT RESUME

ED 160 079 IR 006 238

AUTHOR Roberts, Laurel Lee
TITLE The Effect of Mini/Micro Processors on Computer-Aided Learning Systems at the CSUC.
PUB DATE Mar 78
NOTE 18p.; Paper presented at the Annual Meeting of the Association for the Development of Computer Based Instructional Systems (Dallas, Texas, March 1-4, 1978); For related document, see IR 006 231

EDRS PRICE MF-$0.83 Plus Postage. BC Not Available from EDRS.
DESCRIPTORS *Computer Assisted Instruction; Cost Effectiveness; Curriculum Development; Educational Improvement; Higher Education; Instructional Design; *Instructional Systems; *Interinstitutional Cooperation; *Networks; Resource Allocations
IDENTIFIERS *Microprocessors; *Minicomputers

ABSTRACT

The software and courseware developed on the campuses of a big system such as The California State University and Colleges (CSUC) might be the nucleus of a computer network to deliver cost-effective lessons to the students on all campuses. This paper describes the methodology by which small Computer Assisted Learning (CAL) systems could be initiated on different campuses and then tied together to form a network. At present, existing mini/micro processor-based CAL systems allow the professors on any campus to experiment with CAL inexpensively and provide them with the expertise needed to evaluate and appreciate the advantages of maxi-systems. CSUC needs to explore the potentials of computer-assisted instruction and networking; there is a critical need not only to share resources but also to maintain the individuality of developments on each campus. (VT)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

ED160079

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

# The Effect of Mini/Micro Processors on Computer Aided Learning Systems at the CSUC

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

John J. Hirschbuhl

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

ADCIS Convention March 1977

Interest Group Presentation

by

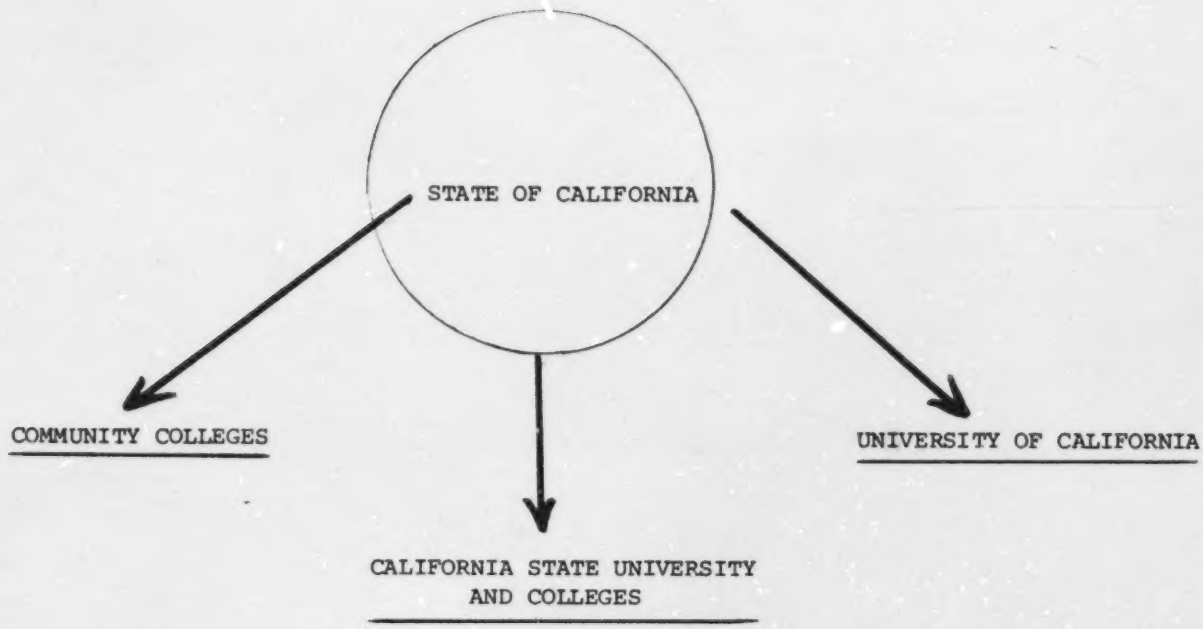
Laurel Lee Roberts, PhD

IR006238

A topic of ongoing concern in several disciplines within the California State University and Colleges is how to take advantage of the boom in the Mini/Micro Systems and how to incorporate them into the educational process. Rather than imposing on any one campus, an already existing Computer-Aided Learning (C.A.L.) System, the mini/micro processor-based CAL systems allow the professors on any campus to experiment with CAL at an inexpensive price and provide them with the expertise needed to evaluate and appreciate the advantages of Maxi-systems. The software and courseware developed on the campuses of a big system such as The California State University and Colleges might then be the nucleus of a computer network to deliver cost-effective lessons to the students on all campuses. The purpose of this paper is to describe the methodology by which small CAL systems could be initiated on different campuses and then tied together to form a network.

## I. INTRODUCTION

Higher education in the State of California, as illustrated in Figure 1, is divided into three components: the California Community College System with over one hundred colleges; the University of California with nine campuses; The California State University and Colleges composed of nineteen campuses. Each component serves a different




TRIPARTATE - THREE SEGMENTS OF HIGHER
EDUCATION IN CALIFORNIA

FIGURE 1

segment of our population and functions based upon very different goals. The community colleges serve over a million students and operate on an open-door or low tuition policy for basically lower division students. Within these institutions, there tends to be a heavy emphasis on vocational education, community service, and the like. The function of the University of California, with its nine campuses, is based upon the goals of research, instruction, and service. The third segment of higher education is The California State University and Colleges, which has traditionally been a system of teaching institutions.

## II. MICROPROCESSORS AND THE CALIFORNIA STATE UNIVERSITY AND COLLEGES

The governance of The California State University and Colleges includes the Governor of California, the California State Legislature, the Board of Trustees who are appointed by the governor for eight year terms, the Chancellor, and the nineteen campus presidents (Figure II).

Our northern most campus is Humboldt State University and our southern most institution is San Diego State University and its Imperial Valley Campus in Calexico on the Mexican border (Figure III). So we are talking about nineteen

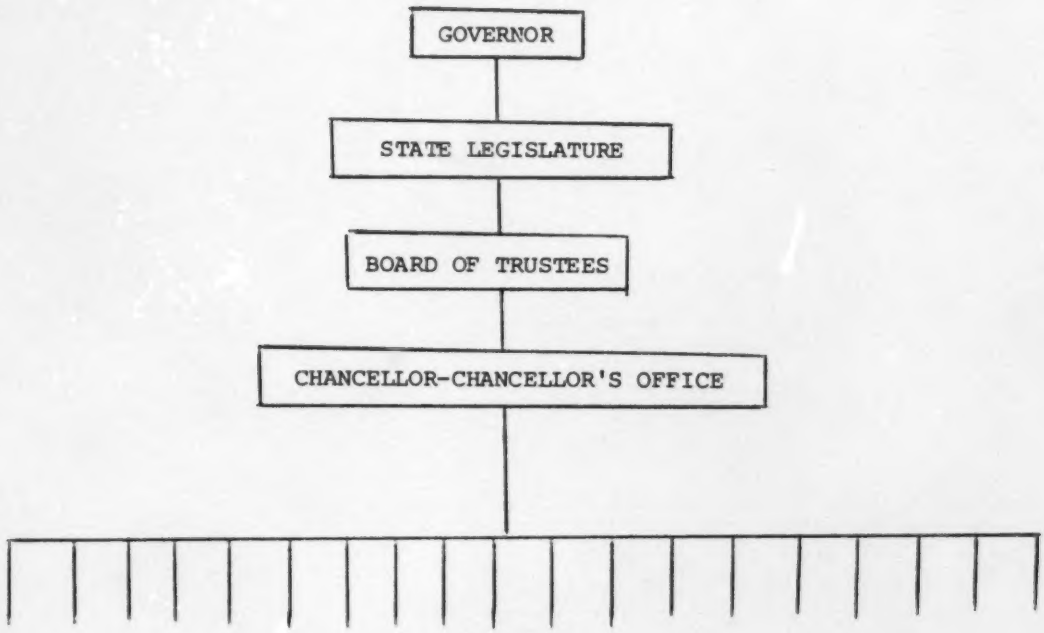

GOVERNOR
STATE LEGISLATURE
BOARD OF TRUSTEES
CHANCELLOR-CHANCELLOR'S OFFICE
CAMPUS PRESIDENTS

FIGURE II

## THE CALIFORNIA STATE UNIVERSITY AND COLLEGES

| Library Name | Code |
|---|---|
| Bakersfield | BK |
| Calexico | CA |
| Chico | CH |
| Dominguez Hills | DH |
| Fresno | FR |
| Fullerton | FU |
| Hayward | HA |
| Humboldt | HU |
| Long Beach | LB |
| Los Angeles | LA |
| Northridge | NO |
| Pomona | PO |
| Sacramento | SA |
| San Bernardino | SB |
| San Diego | SD |
| San Francisco | SF |
| San Jose | SJ |
| San Luis Obispo | SL |
| Sonoma | SN |
| Stanislaus | ST |

FIGURE III

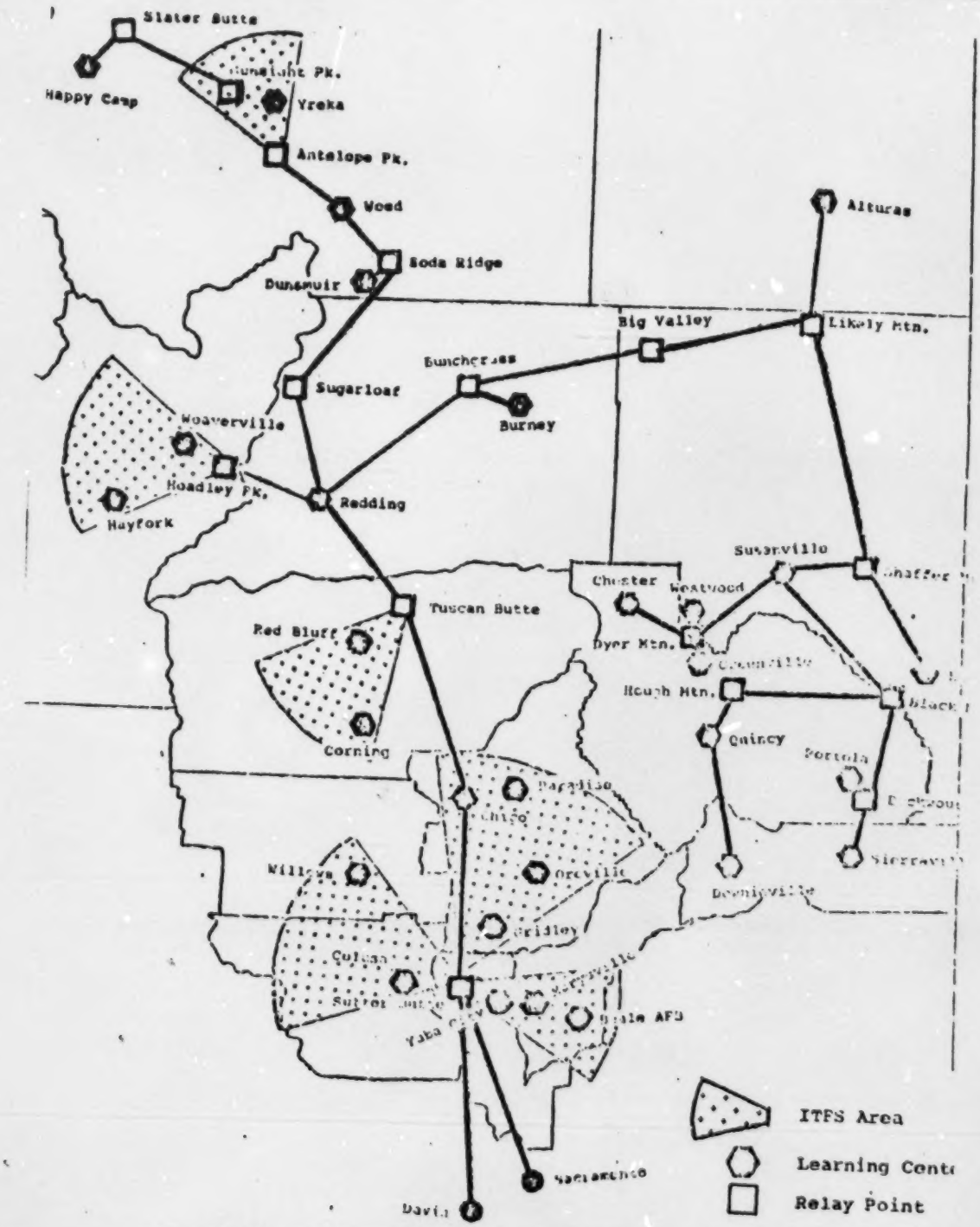



FIGURE 4. TELEVISION DELIVERY SYSTEM

PRIMARY AND SECONDARY VIDEO SYSTEM SHOWING ITFS LOCATIONS

campuses and three satellite learning centers covering approximately 1,000 miles, 17,000 faculty, and 312,000 students. With this in mind, it would be a gross understatement to suggest that the CSUC merely needs to explore the potentials of computer-assisted instruction and networking. Indeed, there is a critical need to share resources and to maintain the individuality of developments on each campus. While there is increasing pressure to more efficiently and effectively instruct greater numbers and diverse populations within existing resources, protecting campus autonomy is of the utmost important as well.

As a matter of fact, the systemwide administrative office of The California State University and Colleges is studying numerous communication networks. For example, we have a microwave television interconnection system between the California State University at Chico, the University of California, Davis, the California State University at Sacramento and several community colleges (Figure IV). We have a library network system utilizing United Parcel Service for interlibrary lending and borrowing among the nineteen campuses throughout the state. Operating in the Los Angeles Basin area is the CSUC Film Loan Network connecting five CSUC campuses in order to share instructional films, to avoid duplicate purchases, and to redirect film

rental fees into consortial funds; thus purchasing additional instructional materials for the five participating campuses. As an extension of this program, there are two other regional film exchange projects: one connecting two northern campuses; one connecting San Diego State with the Calexico campus. In other words, a systemwide network for film exchange is a clear possibility for the immediate future.

In addition, we are utilizing teleconferencing, fascimile transmission, and telephone lease lines. We are exploring satellite communication, rapid transmission and storage of information and we have begun work on a more encompassing telecommunication plan for the entire system. In dealing with such a hugh system like The California State University and Colleges, any means of increasing communication among the campuses becomes critical and the concept of networking becomes a necessity when dealing with budgetary constraints. Charged by the Master Plan of California Higher Education to be instructional institutions, The California State University and Colleges, as a system, needs to utilize computer-assisted instruction and CAI networking becomes a viable option for our consideration.

Within the CSUC, there are several PDP 11/45's that take care of all local timesharing applications. On some campuses, there are also some Data General NOVA's and the like. These minicomputer systems are used to produce and deliver computer-assisted instruction lessons. Our most active campuses involved in mini-CAI work are CSU, Fresno, the California Polytechnic State University at San Luis Obispo, and CSU, Northridge; however, there is considerable activity in this area at the California Polytechnic State University at Pomona, CSU, Fullerton, Humboldt State University, Sonoma State College, San Jose State University and to a limited degree, on most of the other campuses.

Currently, computer-assisted instruction within the CSUC is being done on a Digital Equipment Corporation (DEC) PDP 11/45 - a stand alone mini-timesharing computer. It includes a line printer for hardcopy reports as well as an on-line printer for each cluster of four CRT terminals. From about thirty-two ports available for each campus, roughly ten are connected to DEC Writers which produce hard copy output. The remaining ports are used with Teleray CRT terminals, augmented with audiovisual equipment.

The hardware supports the RSTS-11 Version 6B-02 System. In other words, there are many available languages in the system and most of them are used to develop computer-assisted instruction work.

At our CSU, Northridge campus, eight programs in English grammar and composition have been developed for use by students in the required elementary English course English 130. Up to 300 students have been working on those programs. Also, at that same institution, there has been tremendous response and success with simple interactive drill programs in Algebra, i.e., presentation, response, reinforcement. The range of disciplines involved in mini-CAI activity is very interesting. One of the programs at CSU, Fullerton, called MUSCLE, was written by a biology professor who wanted to provide his students with an exercise in naming and identifying the function of various muscles. Similarily, biologists at San Jose State University have become involved in CAI work.

At CSU, Chico, they have developed a program for teaching farmers how to plant and at Humboldt State University, modules have been written for students studying Genetics.

At the California Polytechnic State University at San Luis Obispo, several programs have been developed to teach BASIC and COBOL. Also, several programs in remedial spelling and arthmetic exist on the system. A language PILOT has been simulated on the system and several CAI programs have been initiated using PILOT as an authoring language.

Also, at Cal Poly, several microprocessors are used in the Electrical Engineering Department to enhance their teaching and laboratory work.

CSU, Fresno has done an interesting thing related to computer-assisted instruction. They have acquired seventy-five CAI programs from numerous sources such as Dartmouth, for campus use. In each case, two faculty members previewed and rated each program and those with the top ratings were rewritten to export to the CSU, Fresno system or to any system. Next, a handbook was generated, called the ABC's of CAI; thus indicating conferences in CAI, faculty throughout the state willing to help with CAI work, sources of course material and a listing of the 75 available programs, which includes a full page evaluative description. Their programs cross many disciplines: Biology, Psychology, Chemistry, Business, Math, Home Economics, Physics, foreign language and education. The amount of CAI activity on the Fresno campus suggests

that mini-CAI work is a high priority item for the computer center staff. In fact, that campus anticipates undertaking a three-year project concerning the development of computer simulations to support instruction in the Social Sciences and to train faculty in the use of mini-computer simulations primarily in the fields of psychology, sociology and/or political science.

In essence, several computer-based mini-CAI programs are being developed, listed and used among our campuses. The goal ahead of us is to tie them all in a network without destroying the individuality of each campus; thus sharing resources while maintaining autonomy. A computer network has existed in CSUC since 1969. The system connects the campuses to CDC 3170 computers in the Division of Information Systems in the central office and in the Northridge Regional Center. The network is basically used for general purposes attempting to combine administrative and instructional work. The Division of Information Systems of the CSUC is presently attempting to measure future goals and campus needs to update the present network.

It is my opinion that future networks should recognize the identity of each campus and should be designed to

allow resource sharing without destroying their respective CAI development. A network of this type would capitalize on what already exists and would encourage cooperation among campuses. The format of the network, in that case, is less critical than the notions of cooperation, sharing, individuality, and the like. The network could be tied to the central office (Figure 5) or it could be completely connected (Figure 6) so that any campus communicates directly with any other institution in the system. In other words, there is no need for a central office to sanction, direct or create a system which may have developed naturally and is based upon need. However, collecting and disseminating information by a central office concerning mini-CAI work will informally tie institutions into a network if one does not already exist. A mini-CAI network would create an awareness of mini-CAI work throughout the state and would avoid unnecessary duplication and omission; thus increase the utilization of existing resources to enhance teaching and facilitate learning. The existence of a network could also be used to encourage campuses to further develop CAI work with a type of software that requires the minimum amount of time and effort to duplicate on another system; thus solving transferability problems.

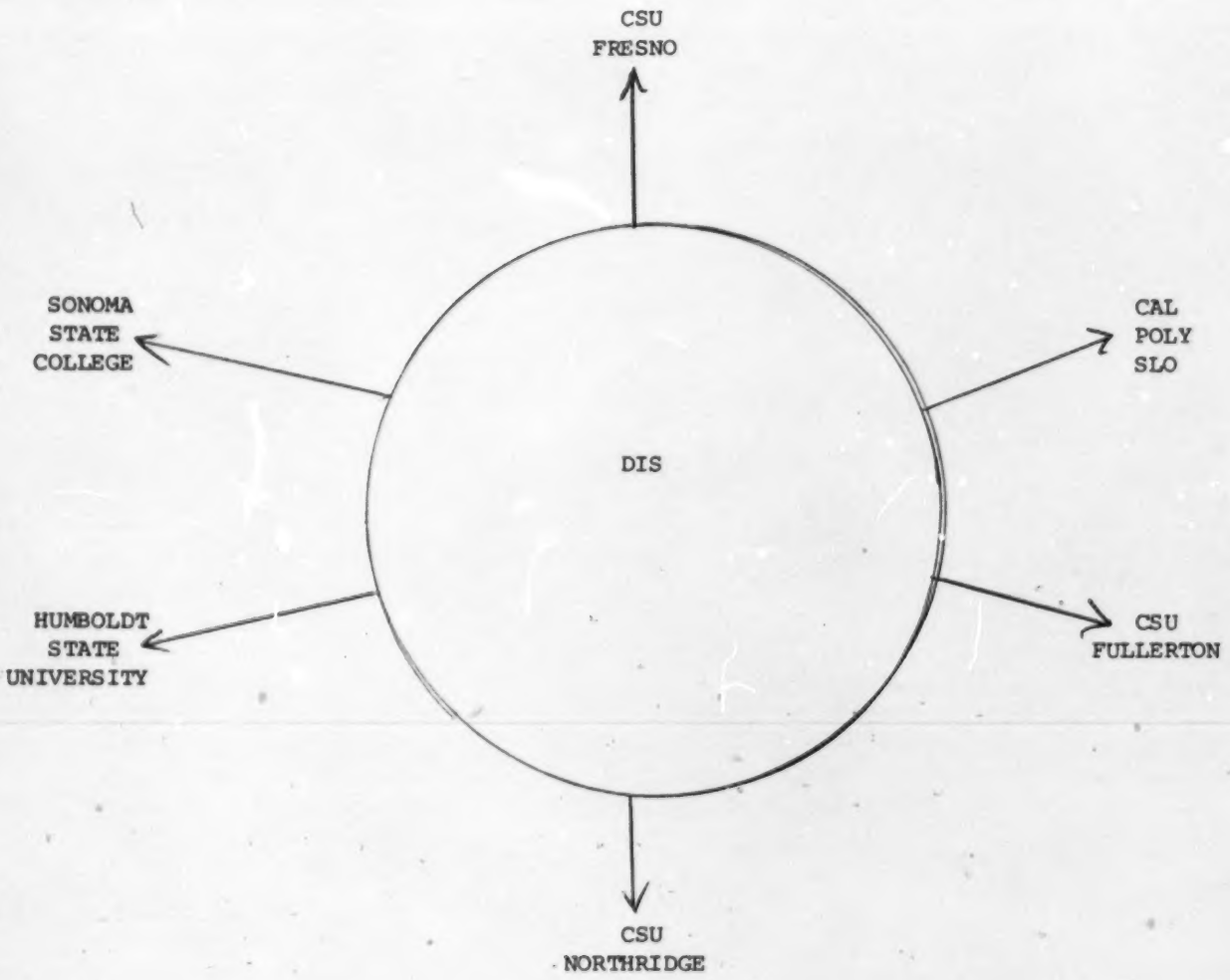
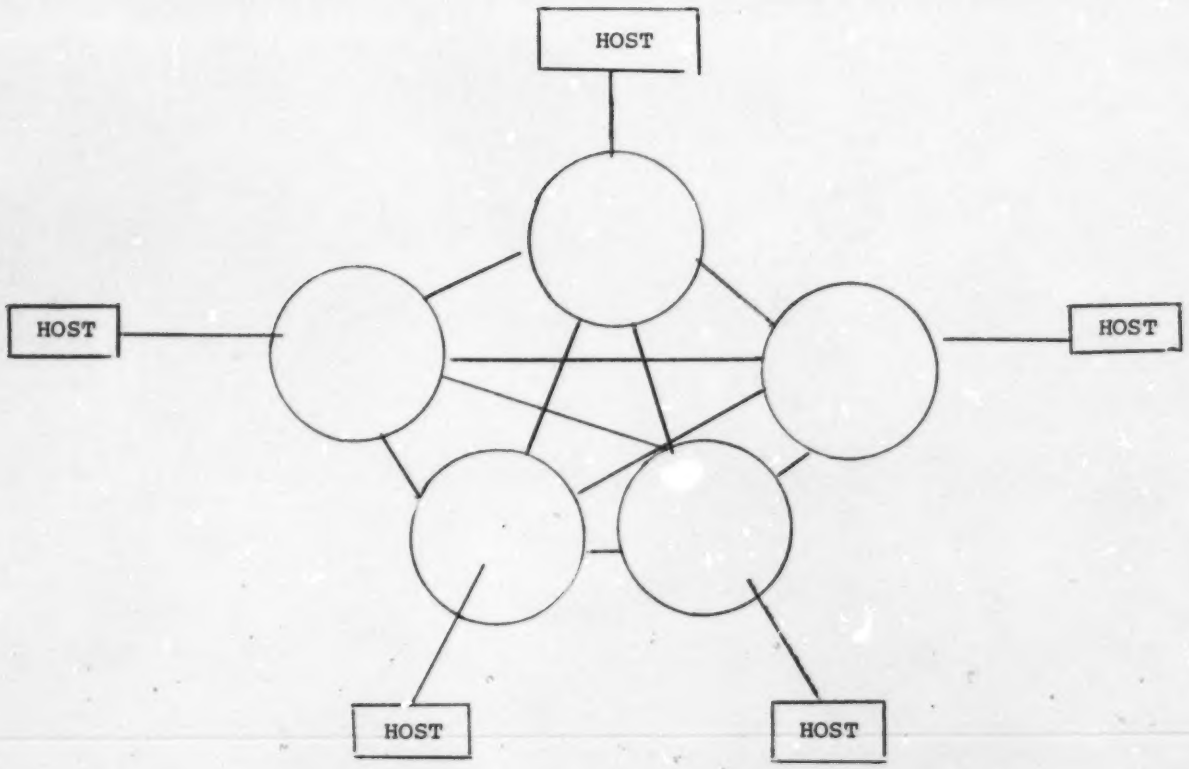

CSU
FRESNO
SONOMA
STATE
COLLEGE
CAL
POLY
SLO
DIS
HUMBOLDT
STATE
UNIVERSITY
CSU
FULLERTON
CSU
NORTHRIDGE

FIGURE 5




COMPLETELY CONNECTED NETWORK

FIGURE 6

## III. CONCLUSION

Encouraging CAI activity on mini-computers, encouraging networking and so on, is just one small piece of the pie. I see microcomputer systems interfacing with other instuctional media equipment to provide expanded educational opportunity in California. Our media and learning centers could utilize mini's and micro's not only for billing and office work, but to interface with photographic darkroom equipment, film editing, television studio, and the like. Microprocessors could be used to store important reference information necessary to the production of mediated instruction and they could be used to compile time consuming utilization statistics; thus freeing our professionals to engage in substantive research, instructional development consultation, and professional renewal. And again, when this is proven successful on individual campuses, it could be the basis for establishing a network.

The importance of mini-CAI work for our institutions is being discussed not only by computer scientists and computer center staff, but it is now a concern of faculty, instructional developers, support staff, and administrators. The establishment of an informal or formal network precludes the transferability of mini-CAI work throughout our system; thus the expansion of educational opportunity is tied to your willingness to share your work and resources.